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EXAMINER	
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ART UNIT	PAPER NUMBER
2623	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/418,142	AVILA ET AL.
	Examiner	Art Unit
	Anand Bhatnagar	2623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 06/11/03 (paper # 7).

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-42 is/are pending in the application.

4a) Of the above claim(s) ______ is/are withdrawn from consideration.

5)☐ Claim(s) ______ is/are allowed.

6)☒ Claim(s) 1-42 is/are rejected.

7)☐ Claim(s) ______ is/are objected to.

8)☐ Claim(s) ______ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on ______ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on ______ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. ______ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
4) ☐ Interview Summary (PTO-413) Paper No(s). ______ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Arguments

1. Applicant's response paper #7 filed on 06/11/03 has been entered and made of record.

2. Applicant's arguments with respect to claims 1-42 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

3. Claims 18 and 34 are objected to because of the following informalities: The word "tomograph" is improper and should have been tomography . Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 6, 7, 9, 11, 17, 18 and 35-41 rejected under 35 U.S.C. 102(e) as being anticipated by Holupka et al. (U.S. patent 6,256,529 B1).

Regarding claim 1: An imaging system comprising:

Holupka et al. discloses an exam prescription subsystem which specifics the manner in which data is to be acquired (fig. 1A elements 13,14, and 16 and col. 4 lines 41-47, where the software on the computer #16 specifies how to obtain the data, i.e. 3D, orthogonal 2D, oblique2D, etc.) and

a visualization subsystem responsible for controlling display of acquired images and data (fig. 1A element 16 and col. 4 lines 41-47, where the software on the computer #16 specifies how to display the data, i.e. 2D slices, 3D, etc.).

Regarding claim 2: An imaging system in further comprising a data acquisition system for acquiring scan data (fig. 1 element 14), and an operator console comprising said exam prescription subsystem and said visualization subsystem (fig. 1 elements 13-16, the operator interface, and the display unit, all these units together make up the operator console).

Regarding claim 3: An imaging system further comprising an archive subsystem for storage of imaging data (fig. 1 and col. 5 lines 60-67, where there is an image data archive incorporated in the system).

Regarding claim 6: An imaging system wherein said exam prescription subsystem acquires parameter data comprising at least one of a sequence of slice locations, slice thickness, field-of-view, scanning technique, and reconstruction algorithm (col. 5 lines 2-10 and 50-53, where 2D image slices are obtained and 3D image rendering is produced. It is inherent that the locations

and thickness of each slice must be tracked so that a proper 3D image can be produced).

Regarding claim 7: An imaging system wherein said parameter is contained in a scan protocol (fig. 1 element 14 and col. 5 lines 2-5, where the data obtain is contained in the image processor card, the image processor card is read as the "scan protocol").

Regarding claim 9: An imaging system in accordance wherein said visualization subsystem is configured to operate in a volume autoview mode so that during data acquisition, a real-time, incrementally updated, three-dimensional view of the data is displayed (col. 4 lines 64-67, where the images are obtained in real time. It is inherent that these images are constantly being updated during the procedure).

Regarding claim 11: An imaging system in accordance with Claim 9 wherein said volume autoview mode can be performed in a rock mode wherein a rotation angle is applied to a 3D model, said rotation angle varying cyclically as the 3D model is rendered from frame to frame (col. 5 lines 1-4, where the transducers are rotate around an axis to obtain the 3D images, examiner reads as changing or adding angles to obtain the 3D images).

Regarding claim 17: An imaging system wherein said rendering subsystem is operable in at least one of a single slice mode and a multiple slice mode (col. 5 lines 3-5, where multiple slices are obtained).

Regarding claim 18: An imaging system wherein said system utilizes at least one of computed tomograph, magnetic resonance, and ultrasound acquired data to generate an image (col. 4 lines 23-27).

Regarding claim 35: Holupka et al. discloses a method for operating a medical imaging system to generate three dimensional models while the system acquires cross-sectional data (col. 5 lines 2-8 and 49-52, where 3D images are generated from obtained 2d data while transverse and orthogonal data is obtained), said method comprising the steps of:

acquiring a first slice of data (col. 5 lines 6-10, where slices are obtained); and

generating a three dimensional model based on the first slice of data (col. 5 lines 49-52).

Regarding claim 36: A method wherein generating a three dimensional model comprises the step of filtering the data (Holupka; col. 6 lines 19-23, where filters can be used to remove noise for better display of images).

Regarding claim 37: A method wherein generating a three dimensional model comprises the step of classifying the data into separate categories (col. 4 lines 40-47, where the data are classified as 3D, orthogonal 2D, oblique 2D, and/or translucent 3D).

Regarding claim 38: A method further comprising the step of performing measurements on the data, the measurements comprising at least one of distance, surface area, volume, regions of interest, and calcification scoring (col.

7 lines 23-27, where the volume scanning is used to determine positions within the patient, the positions are read as the regions of interest).

Regarding claim 39: A method wherein generating a three dimensional model comprises the step of annotating patient and scanning information. It is well known to provide patient information and scanning information on the gathered images of X-ray, CT, and/or MRI of a patient. Examiner takes Official Notice.

Regarding claim 40: A method wherein generating a three dimensional mode comprises incrementally updating a three-dimensional view of the data (Holupka et al.; col. 4 lines 64-67, where the images are obtained in real time. It is inherent that these images are constantly being updated during the procedure).

Regarding claim 41: A method further comprising the step of applying a rotation angle to the model, the rotation angle varying cyclically as the model is rendered from frame to frame (col. 5 lines 1-4, where the transducers are rotate around an axis to obtain the 3D images, examiner reads as changing or adding angles to obtain the 3D images).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

A.) Claims 4, 5, 8, 12, 19, 20-29, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holupka et al. (U.S. patent 6,256,529 B1) and Vining (U.S. patent 5,782,762).

Regarding claim 4: An imaging system further comprising a filming subsystem for transferring data onto film.

Holupka discloses to render a 3D image from obtained 2D data by stacking the 2D images and to display these images (Holupka et al.; fig. 1 elements 13-16, the display attached to the computer in fig. 1, and col. 5 lines 50-56). Holupka et al. further discloses to archive the obtained data (Holupka et al.; fig. 1 and col. 5 lines 60-62). Holupka et al. does not teach to transfer the data onto film. Vining et al. teaches to place the obtained data onto a video (Vining; fig. 3 element 30 and col. 7 lines 52-55, the video is read as the film because it is taped on a video cassette). It would have been obvious to one skilled in the art to combine the reference of Vining to that of Holupka et al. because they are analogous in 3D imaging. One in the art would have been motivated to incorporate the teaching, filming the data, of Vining et al. to that of Holupka et al. so that a permanent record can be made for future viewing (Vining; col. 7 lines 53-54).

Regarding claim 5: An imaging system further comprising a networking subsystem that transfers data via a network to external devices. Holupka et al. does not teach to network to devices. Vining further teaches to network the information to other devices or computer systems (Vining; col. 9 lines 12-25). Neither Holupka et al. nor Vining teach to network the data to external devices. Examiner takes official notice because networking to external devices is well known in the art.

Regarding claims 12 and 29: An imaging system in accordance with wherein said visualization subsystem is configured to operate in a review display mode, said review display mode comprising at least one of a playback mode and a repeat loop mode.

Holupka discloses to render a 3D image from obtained 2D data by stacking the 2D images and to display these images (Holupka et al.; fig. 1 elements 13-16, the display attached to the computer in fig. 1, and col. 5 lines 50-56). Holupka et al. further discloses to archive the obtained data (Holupka et al.; fig. 1 and col. 5 lines 60-62). Holupka et al. does not teach for the display system to contain a review display mode which is composed of a playback mode and a repeat loop mode. Vining et al. teaches to place the obtained data onto a video (Vining; fig. 3 element 30) wherein most videos contain a playback mode as well as a repeat loop mode (where the same segment of a video or the whole video is constantly played back in a loop). It would have been obvious to one skilled in the art to combine the reference of Vining to that of Holupka et al.

because they are analogous in 3D imaging. One in the art would have been motivated to incorporate the playback and the repeat loop mode into the system of Holupka et al. so that a user may play back the stored data as well as play it back more than one time (repeat loop) so that the user can analyze the data until he is confident of the result.

Regarding claims 8 and 19: An imaging system wherein said visualization subsystem comprises a rendering component configured to receive data from at least one of a data acquisition system (Holupka; fig. 1 elements 13 and 14 and col. 5 lines 49-56, where the 2D images are stacked and a rendered 3D image is produced from these 2D image data which is obtained from the image processor card, the image processor card is read as the data acquisition system), a filtering component of said visualization subsystem (Holupka; col. 6 lines 19-23, where filters can be used to remove noise for better display of images), said rendering component configured to generate multiple images based on the acquired data in at least one of a real-time mode and a post-acquisition mode (Holupka; col. 4 lines 41-47 and 55-57, where 2D and/or 3D images are generated based on the data obtained and are performed in real time or after acquiring the data "post acquisition").

As for the limitation of: a segmentation subsystem of said visualization subsystem.

Holupka discloses to render a 3D image from obtained 2D data by stacking the 2D images and to display these images (Holupka et al.; fig. 1

elements 13-16, the display attached to the computer in fig. 1, and col. 5 lines 50-56). Holupka et al. does not teach to segment the images to display them. Vining teaches to segment the images and display these segmented images (Vining; fig. 1 elements 70 and 80 and col. 11 lines 2-6). It would have been obvious to one skilled in the art to combine the reference of Vining to that of Holupka et al. because they are analogous in 3D imaging. One in the art would have been motivated to incorporate the teaching, segmentation of images, of Vining into the system of Holupka et al. in order to segment an organ of interest/ROI from the image for study (Vining; col. 2 lines 65-67).

Regarding claim 20: A visualization subsystem wherein to render an image, said processor is programmed to generate multiple images based on the acquired data in at least one of a real-time mode and a post-acquisition mode (Holupka; col. 4 lines 41-47 and 55-57, where 2D and/or 3D images are generated based on the data obtained and are performed in real time or after acquiring the data "post acquisition").

Regarding claim 21: A visualization subsystem in accordance with Claim 19 wherein said processor is further programmed to apply image processing filters to the data received from the data acquisition system (Holupka; col. 6 lines 19-23, where filters can be used to remove noise for better display of images).

Regarding claim 22: A visualization subsystem wherein said processor is further programmed to classify data into separate categories (Holupka et al.; col.

4 lines 40-47, where the data are classified as 3D, orthogonal 2D, oblique 2D, and/or translucent 3D).

Regarding claim 23: A visualization subsystem in accordance with Claim 19 wherein said processor is further programmed to perform measurements on the data, said measurements comprising at least one of distance, surface area, volume, regions of interest, and calcification scoring (col. 7 lines 23-27, where the volume scanning is used to determine positions within the patient, the positions are read as the regions of interest).

Regarding claim 24: A visualization subsystem wherein the image is rendered in at least one of a real-time mode and a post-acquisition mode (Holupka; col. 4 lines 41-47 and 55-57, where 2D and/or 3D images are generated based on the data obtained and are performed in real time or after acquiring the data "post acquisition").

Regarding claim 25: A visualization subsystem wherein said processor is further programmed to annotate patient and scanning information It is well known to provide patient information and scanning information on the gathered images of X-ray, CT, and/or MRI of a patient. Examiner takes Official Notice.

Regarding claim 26: A visualization subsystem wherein said processor is further programmed to operate in a volume autoview mode so that during data acquisition, a real-time, incrementally updated, three-dimensional view of the data is displayed (Holupka et al.; col. 4 lines 64-67, where the images are

obtained in real time. It is inherent that these images are constantly being updated during the procedure).

Regarding claim 27: A visualization subsystem wherein said processor is further programmed to operate in a static data rendering mode and a mixed data rendering mode. Holupka et al. discloses to obtain data regular images (static mode) as well as obtain images in real time (dynamic mode) (Holupka et al.; col. 4 lines 40-47 and 64-67). It would have been obvious to one skilled in the art to modify the system of Holupka where different display options of the images is available, such as displaying a static image or a mixed mode (where a static and dynamic image is displayed).

Regarding claim 28: A visualization subsystem wherein said volume autoview mode can be performed in a rock mode wherein a rotation angle is applied to a 3D model, said rotation angle varying cyclically as the 3D model is rendered from frame to frame (Holupka et al.; col. 5 lines 1-4, where the transducers are rotate around an axis to obtain the 3D images, examiner reads as changing or adding angles to obtain the 3D images).

Regarding claim 34: A visualization subsystem wherein the scan data at least one of computed tomograph, magnetic resonance, and ultrasound acquired data (Holupka et al.; col. 4 lines 23-27).

B.) Claims 13-16 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holupka et al. (U.S. patent 6,256,529 B1) and Edwards et al. (U.S. patent 5,787,889).

Regarding claims 13 and 42: An imaging system wherein said visualization subsystem generates at least one volumetric model, and wherein projection of said volumetric model onto an image plane is accomplished using at least one of ray casting and texture mapping.

Holupka discloses to render a 3D image from obtained 2D data by stacking the 2D images (Holupka et al.; fig. 1 elements 13-16, the display attached to the computer in fig. 1, and col. 5 lines 50-56). Holupka et al. further teaches to display the 3D images onto a display (Holupka et al.; fig. 1). Holupka et al. does not teach how the 3D volume image data is transformed to fit the 2D display image. Edwards et al. teaches to use ray casting to transform data from a 3D image space into 2D image space (Edwards et al.; col. 13 lines 46-51). It would have been obvious to one skilled in the art to combine the teaching of Edwards et al. to that of Holupka et al. because they are analogous in 3D imaging. Ray casting is a well known technique to transform data from 2D to 3D space and vice versa.

Regarding claim 14: An imaging system wherein said volumetric model is incrementally rendered (Holupka et al.; col. 4 lines 64-67, where the images are obtained in real time. It is inherent that these images are constantly being updated during the procedure).

Regarding claim 15: An imaging system wherein said volumetric model is rendered using a sliding window (Holupka et al.; col. 5 lines 43-46, where a real time window is used, i.e. the information being updated as data is gathered in real time).

Regarding claim 16: An imaging system wherein said volumetric model is defined in a hierarchical data structure (Holupka et al.; col. 5 lines 1-14, where an orthogonal or transverse slice through the 3D space is obtained).

C.) Claims 30-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holupka et al. (U.S. patent 6,256,529 B1) as modified by Vining (U.S. patent 5,782,762) and further view of Edwards et al. (U.S. patent 5,787,889).

Regarding claim 30: It is rejected for the same reason as claim 13.

Regarding claim 31: It is rejected for the same reason as claim 14.

Regarding claim 32: It is rejected for the same reason as claim 15.

Regarding claim 33: It is rejected for the same reason as claim 16.

D.) Claims 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Holupka et al. (U.S. patent 6,256,529 B1).

Regarding claim 10: A visualization subsystem wherein said processor is further programmed to operate in a static data rendering mode and a mixed data rendering mode. Holupka et al. discloses to obtain data regular images (static

mode) as well as obtain images in real time (dynamic mode) (Holupka et al.; col. 4 lines 40-47 and 64-67). It would have been obvious to one skilled in the art to modify the system of Holupka where different display options of the images is available, such as displaying a static image or a mixed mode (where a static and dynamic image is displayed).

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Roth (U.S. patent 5,315,512) for ultrasound 3D.

Corby, Jr. (U.S. patent 5,274,551) for real time 3D navigation.

Anderson (U.S. patent 5,601,083) for real time 3D.

Contact Information

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anand Bhatnagar whose telephone number is (703) 306-5914, whose supervisor is Amelia Au whose number is 703-308-6604, group fax is 703-872-9314, and Tech center 2600 customer service office number is 703-306-0377.

AB

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July 7, 2003

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